

**REMARKS/ARGUMENTS**

Claims 10, 12-20 and 29-62 stand in the present application, claims 10 and 29 having been amended. Reconsideration and favorable action is respectfully requested in view of the above amendments and the following remarks.

In the Reply Brief, the Examiner has rejected claims 10, 12-20 and 29-40 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement and under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellants regard as the invention. As noted above, Applicants have amended independent claims 10 and 29 in accordance with the suggestions provided by the Examiner in the Reply Brief to overcome the 35 U.S.C. § 112, first and second paragraph, rejections of the claims. Accordingly, the claims as amended are now believed to comply with all portions of 35 U.S.C. § 112.

The Examiner has rejected claims 12-20, 29-45, 48-49, 52-53, 55-56 and 59-60 under 35 U.S.C. §§ 102 and 103 as anticipated or obvious over various cited references. Applicants respectfully traverse the Examiner's § 102 and 103 rejections of the claims.

With respect to independent claims 10 and 29 and their respective dependent claims 12-20 and 30-40 the amendments made to obviate the Examiner's 35 U.S.C. § 112 rejections are also believed to more clearly patentably define these claims over the cited art, as will be discussed in greater detail below. With respect to independent claims 41, 44, 52, and 55 and their respective dependent claims 42-43, 45-51, 53-54, and 56-62 it is respectively submitted that these claims do not constitute mere matters

of design choice as alleged by the Examiner, and that the case law cited by the Examiner for this proposition is inapposite to the rejections of these claims, as also will be explained in greater detail below.

**A. Claims 29-32 are not anticipated under 35 U.S.C. § 102(b) by Webb or Johnson.**

In rejecting claims 29-32 as being anticipated by Webb or Johnson, the Examiner has erroneously used a single upper tang (one on each side of the bucket) to determine a single point used to define a line forming an angle of  $20.782^\circ$  with the center line of the bucket. If the two uppermost tangs of each reference are used, as required by the claim language, to define the line then the angle formed with the center line is less than  $14^\circ$  in Webb and less than  $16^\circ$  in Johnson. Indeed, the Johnson reference discloses the angle formed by tangent line TN and center line RCL, shown in Figure 1, to be  $15.75^\circ$ . See Johnson at Figure 1 and column 4, lines 6-9.

Appellant has used the two uppermost tangs in Webb and Johnson to define two points of a line that form the angular relationship of  $20.782^\circ$  disclosed and claimed in the present application. As noted above, to more clearly define this requirement Applicants have amended claim 29 in accordance with the Examiner's suggestion in the Reply Brief to obviate the alleged 112 deficiency.

In Webb, if the two uppermost tangs are used to define the line that forms an angle with the center line of its bucket, an angle of less than  $14^\circ$  results. In Johnson, if the two uppermost tangs are used to define the line that forms an angle with the center line of its bucket, an angle of less than  $16^\circ$  results. Accordingly, neither Webb nor

Johnson teaches or suggests the angular relationship of 20.782° disclosed and claimed in the present application.

In applying Webb and Johnson against these claims the Examiner only used the single uppermost tang of each reference to determine a single point of the line that forms the angle with the respective bucket's centerline -- the Examiner then simply drew the line through the single determined point to form an angle of 20.782°. The Examiner's actions in this regard are not in accordance with amended claim 29 which requires using the two uppermost tangs on each side of a centerline bisecting the bucket, thereby defining a single specific line that formed an angle of 20.782° with the bucket center line.

In addition, it is noted that Webb utilizes key 24 (first embodiment) or key 50 (alternative embodiment) for locking and retaining the turbine rotor blades on the turbine wheel. See, Webb at Figures 1-8, column 1, lines 19-22, column 2, lines 60-66, and column 3, lines 32-75. Moreover, Webb states that "[i]t is to be understood that the particular slot and root form is immaterial." See, column 2, lines 23-24. Thus, Webb also does not teach or suggest the following limitation of claim 29:

wherein said interleaved system of fillets and tangs on said bucket and wheelpost act to reduce stresses acting along on said fitted bucket and wheelpost, the fillets and tangs of said interleaved system of fillets and tangs each being formed by a combination of curved and straight surfaces . . .

Since Webb states that "the particular slot and root form is immaterial" it is clear that it is relying on its disclosed locking keys for maintaining the rotor blades attached to the turbine wheel, and is not in any way concerned with, let alone disclosing, a system of

interleaved fillets and tangs for reducing stresses acting along the fitted bucket and wheelpost, as required by claim 29.

Accordingly, claims 29-32 are believed to patentably define over Webb and Johnson and the Examiner's rejection of these claims as anticipated by these references should be reversed.

**B. Claims 10 and 13-19 would not have been obvious under 35 U.S.C. § 103(a) over Webb in view of By.**

In rejecting claims 10 and 13-19 as being unpatentable over Webb in view of By, the Examiner has erroneously applied Webb as above with respect to claims 29-32. More particularly, as noted above, Webb does not teach or suggest the angular relationship of  $20.782^\circ$  between the specifically determined line (using the two uppermost tangs on each side of the bucket) and the centerline now more clearly required by amended independent claim 10.

Since By is directed to the profile of airfoil 10 and not to the profile of dovetail 16, it should be clear that it does not solve this deficiency of Webb. More particularly, By does not disclose any dimensions or angular relationships regarding the configuration of dovetail 16 and, therefore, also does not teach or suggest the required angular relationship of  $20.782^\circ$  between the specifically determined line (using the two uppermost tangs on each side of the bucket) and the center line required by independent claim 10.

Indeed, the Examiner has only cited By for disclosing first and second stages of a turbine having a wheel with sixty broach slots. Accordingly, it is respectfully submitted

that claims 10 and 13-17 patentably define over Webb and By, taken singly or in combination, and that the Examiner's rejections of these claims should be reversed.

With respect to the rejection of claims 18 and 19 the Examiner alleges that the specific dimensions given for the bottom tang and bottom fillet, respectively, are mere "matters of choice in design" and cites to *In re Boesch*, 617 F.2d 272 (CCPA 1980) for support of his assertion. However, *In re Boesch* involved a chemical composition case in which there were overlapping ranges between the claimed constituents and those disclosed in the prior art. In addition, the cited case involved an alleged unexpected result for the concentration of a single constituent material. Neither of these factors is present here and, accordingly, the case law cited by the Examiner is inapposite. Claims 18 and 19 require specific dimensions for specific structures, and do not merely recite ranges. Moreover, these claims recite multiple specific dimensions and configurations for multiple structures from among an infinite number of possibilities for the dimensions and angular relationships of the specific tangs and fillets. The Supreme Court's recent *KSR* decision, stated:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under §103.

*KSR Int'l v. Teleflex, Inc.*, 550 U.S. 398 (2007) (Syllabus at p.17, emphasis supplied).

Thus, under *KSR* Appellants' invention would not have been obvious, since there were virtually an infinite number of options for the specific number, angular relationships

between, and dimensions of the tangs and fillets of the buckets and wheelposts the specific relationships and dimensions arrived at in these claims and not a finite number of identified, predictable solutions.

For all of these reasons it is improper for the Examiner to allege that the specific recitations of these claims are mere matters of design choice. Accordingly, claims 18 and 19 are believed to further patentably define over the cited art, taken singly or in combination.

**C. Claim 12 would not have been obvious under 35 U.S.C. § 103(a) over Webb and By in view of the '142 patent.**

In rejecting claim 12, the Examiner has relied on a combination of Webb, By and the '142 patent. As noted above, neither Webb nor By teach or suggest the required angular relationship of  $20.782^\circ$  between the specifically determined line (using the two uppermost tangs on each side of the bucket) and the center line of the bucket as now more clearly required by amended independent claim 10 from which claim 12 depends. Since, the '142 patent has only been cited for disclosing "bucket tangs having an angle of 55 degrees" it should be clear that this reference does not solve the deficiency noted above regarding the required angular relationship of  $20.782^\circ$ . Indeed, Figure 1 of the '142 patent clearly indicates that the required angular relationship would be only  $15^\circ$  (i.e., half of the  $30^\circ$  angle shown in Figure 1 of the '142 patent). Accordingly, it is respectfully submitted that claim 12 patentably defines over Webb, By and the '142 patent, taken singly or in any combination, and that the Examiner's rejection of this claim should be reversed.

**D. Claim 20 would not have been obvious under 35 U.S.C. § 103(a) in view of Caruso.**

In rejecting claim 20, over a combination of Webb, By and Caruso, the Examiner merely cites Caruso for disclosing that the "outer tang edge of each wheelpost is scalloped." Thus, it should be clear that Caruso does not solve the deficiencies noted above with respect to Webb and By. Namely, none of these three references teaches or suggest the required angular relationship of amended independent claim 10 from which claim 20 depends. Accordingly, claim 20 is believed to patentably define over the cited art taken singly or in combination.

Moreover, Caruso does not teach anywhere in its disclosure that it is providing scalloped wheelposts as required by claim 20. Caruso is concerned with a system that provides for the final bucket to be radially inserted into the wheelpost thereby allowing interlocking covers 18 to mate with each other. See, Caruso at Figures 1-3 and column 3, line 32 to column 4, line 22. There is simply no mention anywhere in Caruso of providing scalloped wheelposts to reduce the weight of the wheel, as required by claim 20. Apparently, the Examiner has misinterpreted Figure 1 (the only figure directed to the wheel in Caruso) as showing "scalloped tangs." Figure 1 merely shows two protrusions, i.e., additional material not removed material, on the outer tang of wheel 10 and does not otherwise describe or even identify these protrusions with a reference numeral anywhere in its specification.

Accordingly, it is respectfully submitted that, absent the hindsight provided by Appellant's application, those skilled in the art would not have considered the protrusions or the Caruso reference as disclosing scalloped wheelposts. Therefore,

claim 20 is believed to patentably define over the cited references for this additional reason.

**E. Claim 33 would not have been obvious under 35 U.S.C.**

**§ 103(a) over Webb.**

In rejecting claim 33 as being unpatentable over Webb the Examiner asserts that the specific dimensions given for the bottom tang is a mere "matter of choice in design" and cites to *In re Boesch*, 617 F.2d 272 (CCPA 1980) for support of his assertion. However, as previously noted, *In re Boesch* involved a chemical composition case in which there were overlapping ranges between the claimed constituents and those disclosed in the prior art. In addition, the cited case law involved an alleged unexpected result for the concentration of a single constituent material. Neither of these factors is present here and, accordingly, the case law cited by the Examiner is inapposite.

Claim 33 requires specific dimensions for specific structures, and does not merely recite ranges. Moreover, this claim recites multiple specific dimensions and configurations for multiple structures from among an infinite number of possibilities for the dimensions and angular relationships of the specific tangs and fillets and thus does not meet the requirement of a finite number of identified, predictable solutions as set forth in the Supreme Court's *KSR* decision. For all of these reasons it is improper for the Examiner to allege that the specific recitations of claim 33 are a mere matter of design choice. Accordingly, claim 33 is believed to further patentably define over the cited art and, therefore, the Examiner's rejection of the claim should be reversed.

Moreover, as noted above, Webb fails to teach or suggest the specific angular relationship required in amended independent claim 29 from which claim 33 depends.



Accordingly, claim 33 is believed to also patentably define over Webb by virtue of its dependency from claim 29.

**F. Claims 34-40 would not have been obvious under 35 U.S.C.**

**§ 103(a) over Webb in view of Leonardi.**

In rejecting claims 34-40 the Examiner has relied on a combination of Webb and Leonardi. As noted above, Webb does not teach or suggest the required angular relationship of 20.782° between the specifically determined line (using the two uppermost tangs on each side of the bucket) and the centerline as now more clearly required in amended independent claim 10 from which claim 12 depends. Since Leonardi has only been cited for disclosing tangs formed from curved surfaces with more than one radii of curvature, it should be clear that this reference does not solve the deficiency of Webb noted above regarding the required angular relationship of 20.782°. Accordingly, it is respectfully submitted that claims 34-40 patentably define over Webb and Leonardi, taken singly or in combination, and that the Examiner's rejection of these claims should be reversed.

**G. Claims 41-43 would not have been obvious under 35 U.S.C.**

**§ 103(a) over Pisz in view of By.**

The Examiner admits that neither Pisz nor By disclose the specific dimensional relationships for the fillets and tangs as required by claims 41-43. In rejecting the claims the Examiner improperly asserts that the specific dimensions given for the fillets and tangs in claims 41-43 are mere "matters of choice in design" and cites to *In re Boesch*, 617 F.2d 272 (CCPA 1980) for support of his assertion. However, as previously noted, *In re Boesch* involved a chemical composition case in which there

were overlapping ranges between the claimed constituents and those disclosed in the prior art. In addition, the cited case law involved an alleged unexpected result for the concentration of a single constituent material. Neither of these factors is present here and, accordingly, the case law cited by the Examiner is inapposite. Moreover, while *KSR*, as discussed above, holds that a finite number of identified, predictable solutions within the technical grasp of one skilled in the art might have been obvious to try this is not the case here.

Claims 41-43 require specific dimensions for specific structures, and do not merely recite ranges. In addition to the specific radius of curvature required by claim 41 the claim requires specific other parameters from a virtually infinite number of such parameter choices. More particularly, claim 41 also requires that there be 60 wheel and broach slots, and that the interleaved fillets and tangs be formed by a combination of curved and straight surfaces. Thus these additional specific requirements together with the specific radius of curvature have been selected from an infinite number of parameters to optimize. Moreover, the dependant claims 42-43 recite multiple specific dimensions and configurations for multiple structures from among an infinite number of possibilities for the dimensions and angular relationships of the specific tangs and fillets.

For all of these reasons it is improper for the Examiner to allege that the specific recitations of claims 41-43 are mere matters of design choice. Accordingly, claims 41-43 are believed to patentably define over the cited art, taken either singly or in combination, and, therefore, the Examiner's rejection of the claims should be reversed.

**H. Claims 44-45, 55-56 and 59-60 would have been obvious under 35 U.S.C. § 103(a) over Heinig in view of By.**

The Examiner admits that neither Heinig nor By disclose the specific dimensional relationships for the fillets and tangs as required by claims 44-45, 55-56 and 59-60. In rejecting the claims the Examiner improperly asserts that the specific dimensions given for the fillets and tangs in these claims are mere matters of choice in design, and cites to *In re Boesch*, 617 F.2d 272 (CCPA 1980) for support of his assertion. However, as previously noted, *In re Boesch* involved a chemical composition case in which there were overlapping ranges between the claimed constituents and those disclosed in the prior art. In addition, the cited case law involved an alleged unexpected result for the concentration of a single constituent material. Neither of these factors are present here and, accordingly, the case law cited by the Examiner is inapposite. Moreover, while *KSR*, as discussed above, holds that a finite number of identified, predictable solutions within the technical grasp of one skilled in the art might have been obvious to try this is not the case here.

Each of the rejected claims require specific dimensions for specific structures, and do not merely recite ranges. In addition to the specific dimensions required by independent claims 44 and 55, the claims require specific other parameters from a virtually infinite number of such parameter choices, namely, that there be 60 wheel and broach slots, and that the interleaved fillets and tangs be formed by a combination of curved and straight surfaces. Thus these additional specific requirements together with the specific dimensions have been selected from an infinite number of parameters to optimize. Moreover, the dependant claims 45, 56, 59 and 60 further require multiple

specific dimensions and configurations for multiple structures from among an infinite number of possibilities for the dimensional relationships of the specific tangs and fillets.

For all of these reasons it is improper for the Examiner to allege that the specific recitations of these claims are mere matters of design choice. Accordingly, claims 44-45, 55-56 and 59-60 are believed to patentably define over the cited art, taken either singly or in combination, and, therefore, the Examiner's rejection of the claims should be reversed.

**I. Claims 48-49 would not have been obvious under 35 U.S.C.**

**§ 103(a) over Heinig and By in view of Phipps.**

In rejecting claims 48-49 the Examiner has applied Phipps in combination with Heinig and By. The Examiner admits that none of the cited references discloses any of the specific dimensions for the tangs and fillets required by the rejected claims.

Indeed, Phipps is only being cited for disclosing 55° for the angle between the upper most straight portion of the upper most fillet and the upper most straight portion of the upper most tang instead of the required angle of 50° in claims 48 and 49. Moreover, Phipps does not even disclose the Examiner's alleged angle of 55° anywhere in its specification. Nor is there any figure in Phipps from which an accurate measurement of the angle could be obtained – Figures 1 and 2 are perspective drawings and Figure 3 is a partial drawing that does not even show the upper fillet and tang from which the required angle could be measured.

Since none of the cited references teach or suggest the specific dimensional and angular relationships of the tangs and fillet required by claims 48 and 49, these claims are believed to patentably define over the cited art taken singly or in combination.

**J. Claims 52-53 would not have been obvious over Johnson in view of By.**

In rejecting these claims the Examiner has misapplied the cited art. More particularly, the Examiner is asserting bucket dimensions disclosed in Johnson against broach slot dimensions required by claims 52-53. Moreover, the Examiner alleges that compound radii R3 and R4 (equal to each other, but applied from different points taken along a centerline of the tang) for the dimensioning of the upper tang of the bucket, as shown in Figure 1 of Johnson, somehow reads onto the single radius of curvature required for the fillet recited in claim 52 (i.e., R11 as shown in Fig. 12 and described at paragraph 65 of Appellant's application).

Nowhere does Johnson teach or suggest the single radius of curvature required for the fillet in claim 52. Nowhere does Johnson teach or suggest the single radius of curvature required for the fillet in claim 53. Finally, as noted above, By clearly does not overcome these deficiencies of Johnson since it merely discloses profile dimensions for turbine blades not dovetails, and it has merely been cited for disclosing a turbine wheel having sixty buckets.

Finally, it should be pointed again, that the dimensions for the tangs and fillets required in these claims are not merely design choices, and that the Examiner's case law citation to *In re Boesch* is inapposite here, for the same reasons given above. Moreover, while *KSR*, as discussed above, holds that a finite number of identified, predictable solutions within the technical grasp of one skilled in the art might have been obvious to try this is not the case here.

Each of the rejected claims require specific dimensions for specific structures, and do not merely recite ranges. In addition to the specific dimensions required by independent claim 52, the claims requires specific other parameters from a virtually infinite number of such parameter choices, namely, that there be 60 wheel and broach slots, and that the interleaved fillets and tangs be formed by a combination of curved and straight surfaces. Thus these additional specific requirements together with the specific dimension have been selected from an infinite number of parameters to optimize. Moreover, the dependant claim 53 further requires a specific radius of curvature for a fillet from among an infinite number of possibilities for the dimensional relationships of the specific tangs and fillets.

Accordingly, claims 52-53 are believed to patentably define over the cited art, taken either singly or in combination, and, therefore, the Examiner's rejection of the claims should be reversed.

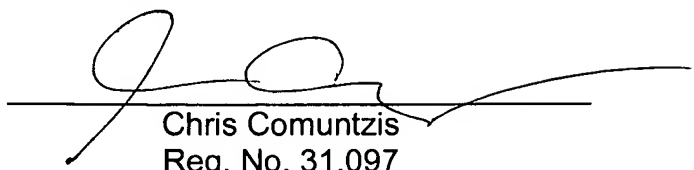
Therefore, in view of the above amendments and remarks, it is respectfully requested that the application be reconsidered and that all of the claims, standing in the application, be allowed and that the case be passed to issue. If there are any other issues remaining which the Examiner believes could be resolved through either a supplemental response or an Examiner's amendment, the Examiner is respectfully requested to contact the undersigned at the local telephone exchange indicated below.

LAGRANGE et al.  
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Respectfully submitted,

**NIXON & VANDERHYE P.C.**

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